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Date:
20 October 2020

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Ref: (12/4/12L-W4/A3)

Dear Mrs Thivhafuni

MATIMBA POWER STATION'S MONTHLY EMISSIONS REPORT FOR THE MONTH OF SEPTEMBER 2020

This serves as the monthly report required in terms of Section 7.7.1 in Matimba Power Station's Atmospheric Emission License 12/4/12L-W4/A4.



Matimba Power Station
Management
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Tel +27 14 763 8911 Fax +27 14 763 3616 www.eskom.co.za
Eskom Holdings SOC Ltd Reg No 2002/015527/30

Raw Materials and Products

Table 1: Quantity of Raw Materials and Products used/produced for the month.

Raw Materials and Products used	Raw Material Type	Unit	Maximum Permitted Consumption Rate (Quantity)	Consumption Rate
	Coal	Tons/month	1 500 000	1 348 622
	Fuel Oil	Tons/month	1 200	373,713
Production Rates	Product/ By-Product Name	Unit	Maximum Production Capacity Permitted (Quantity)	Production Rate
	Energy	GWh	4 212.6	1 823,009

Abatement Technology

Table 2: Abatement Equipment Control Technology utilise.

Associated Unit	Technology Type	Actual Utilisation (%)
Unit 1	Electrostatic Precipitator	99,968%
Unit 2	Electrostatic Precipitator	Unit Off-line
Unit 3	Electrostatic Precipitator	99,946%
Unit 4	Electrostatic Precipitator	99,953%
Unit 5	Electrostatic Precipitator	99,974%
Unit 6	Electrostatic Precipitator	99,937%

Associated Unit	Technology Type	Actual Utilisation (%)
Unit 1	SO ₃ Plant	97
Unit 2	SO ₃ Plant	
Unit 3	SO ₃ Plant	93
Unit 4	SO ₃ Plant	93
Unit 5	SO ₃ Plant	93
Unit 6	SO ₃ Plant	90

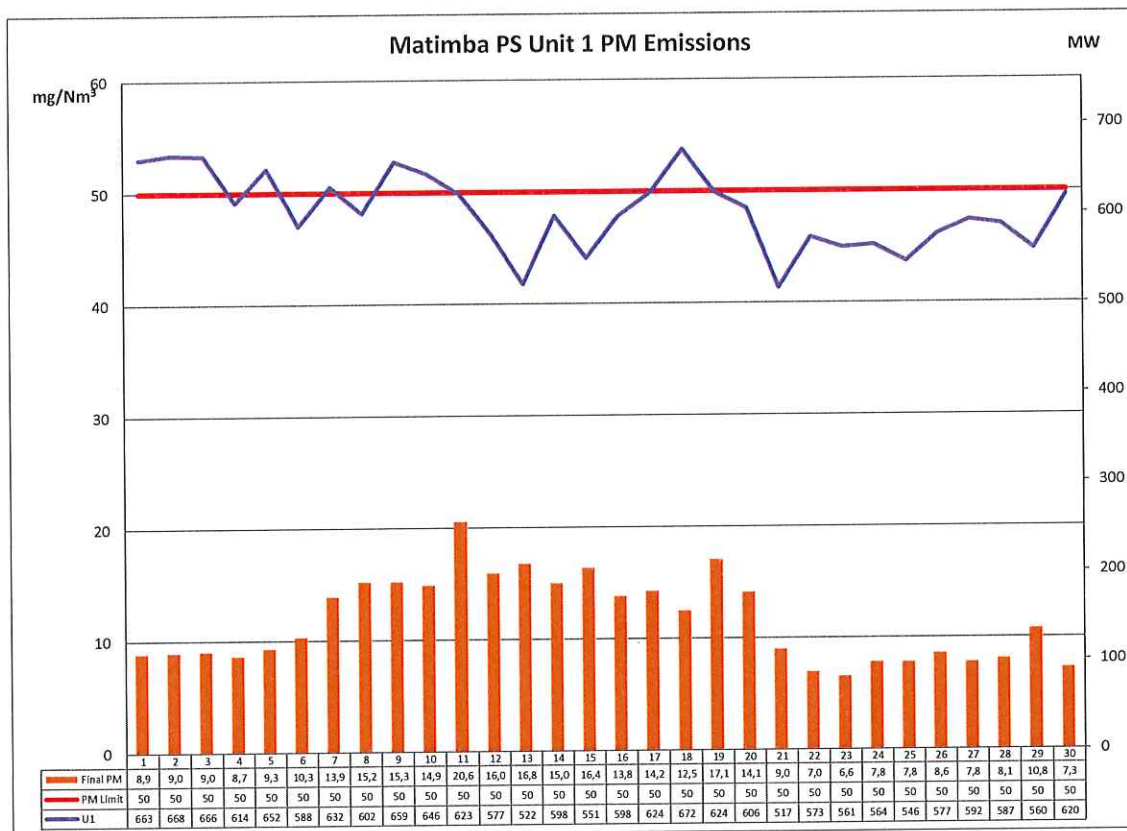
Energy Source Characteristics

Table 3: Energy Source Material Characteristics.

	Characteristic	Stipulated Range (Unit)	Monthly Average Content
Coal burned	Sulphur Content	0.8-1.6%	1,3%
	Ash Content	30-40%	32,65%

Emissions Reporting

Unit 1 particulate emissions

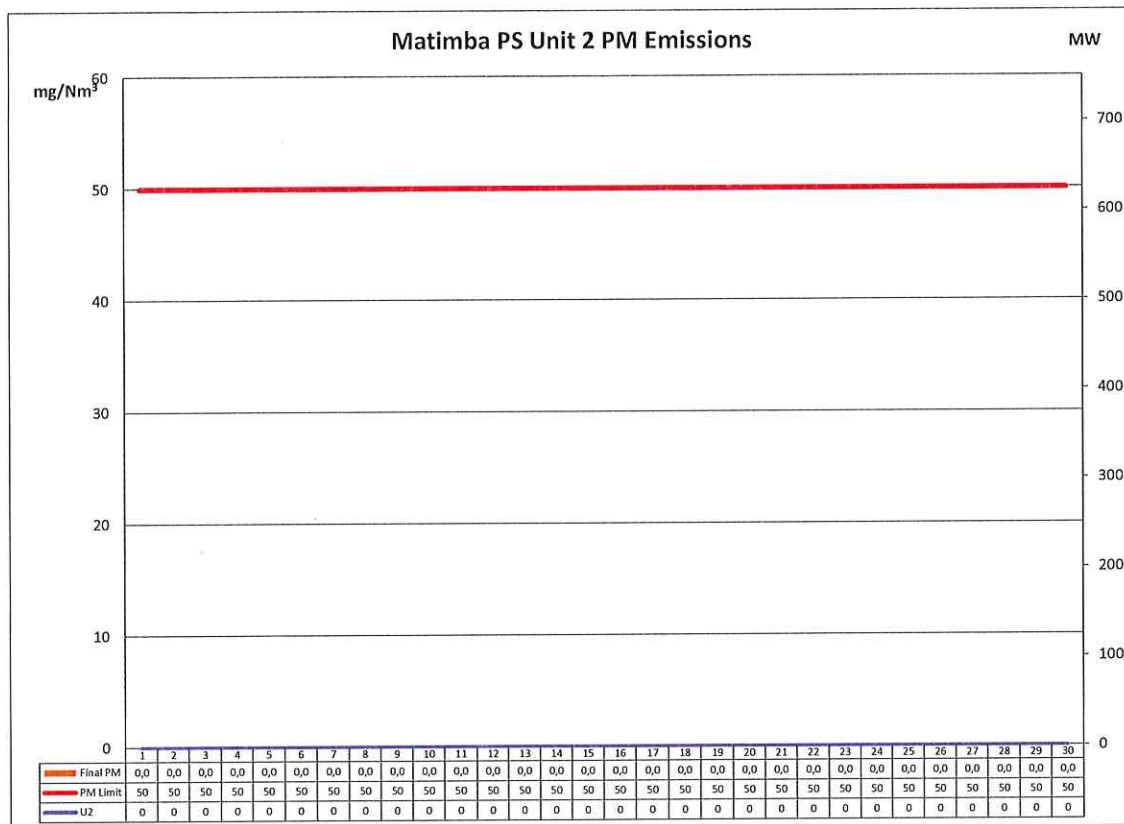


Graph 1: Particulate matter daily average emissions against emission limit for unit 1 for the month of September 2020

Interpretation:

All daily averages below particulate emission limit of 50 mg/Nm³.

Unit 2 particulate emissions

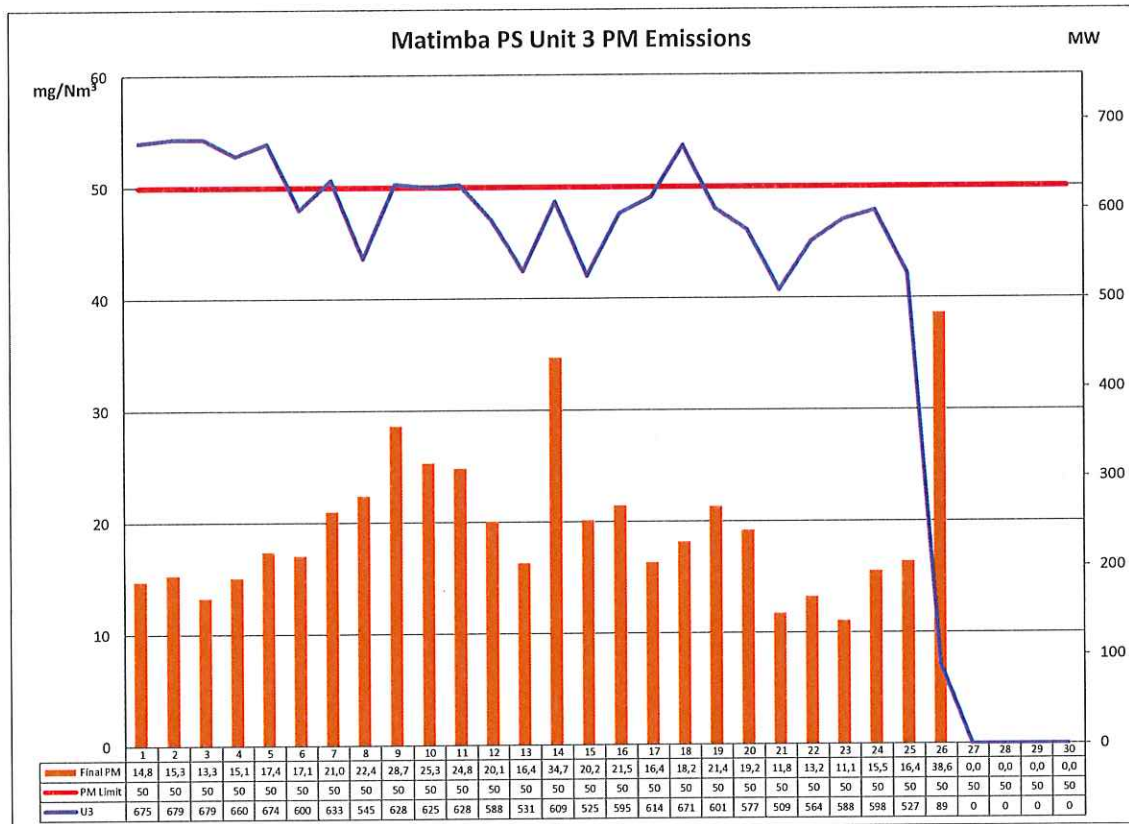


Graph 2: Particulate matter daily average emissions against emission limit for unit 2 for the month of September 2020

Interpretation:

All daily averages below particulate emission limit of 50 mg/Nm³.

Unit 3 particulate emissions

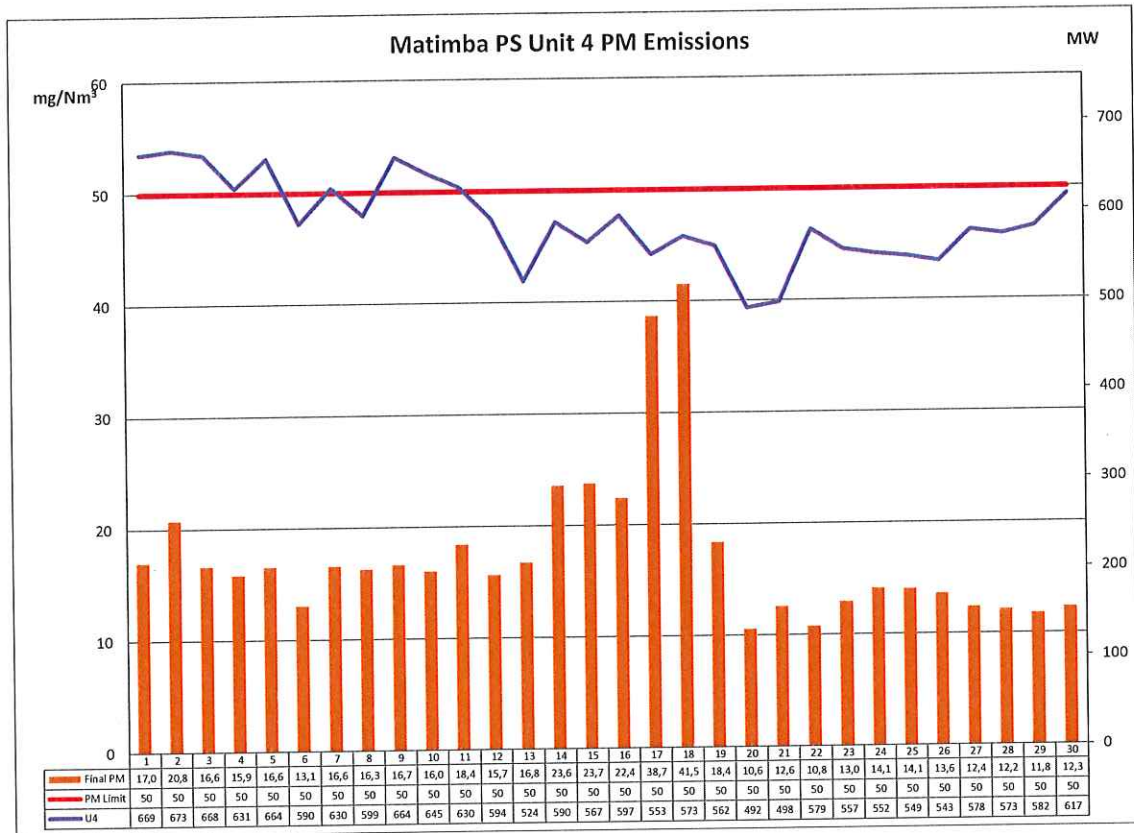


Graph 3: Particulate matter daily average emissions against emission limit for unit 3 for the month of September 2020

Interpretation:

All daily averages below particulate emission limit of 50 mg/Nm³.

Unit 4 particulate emissions

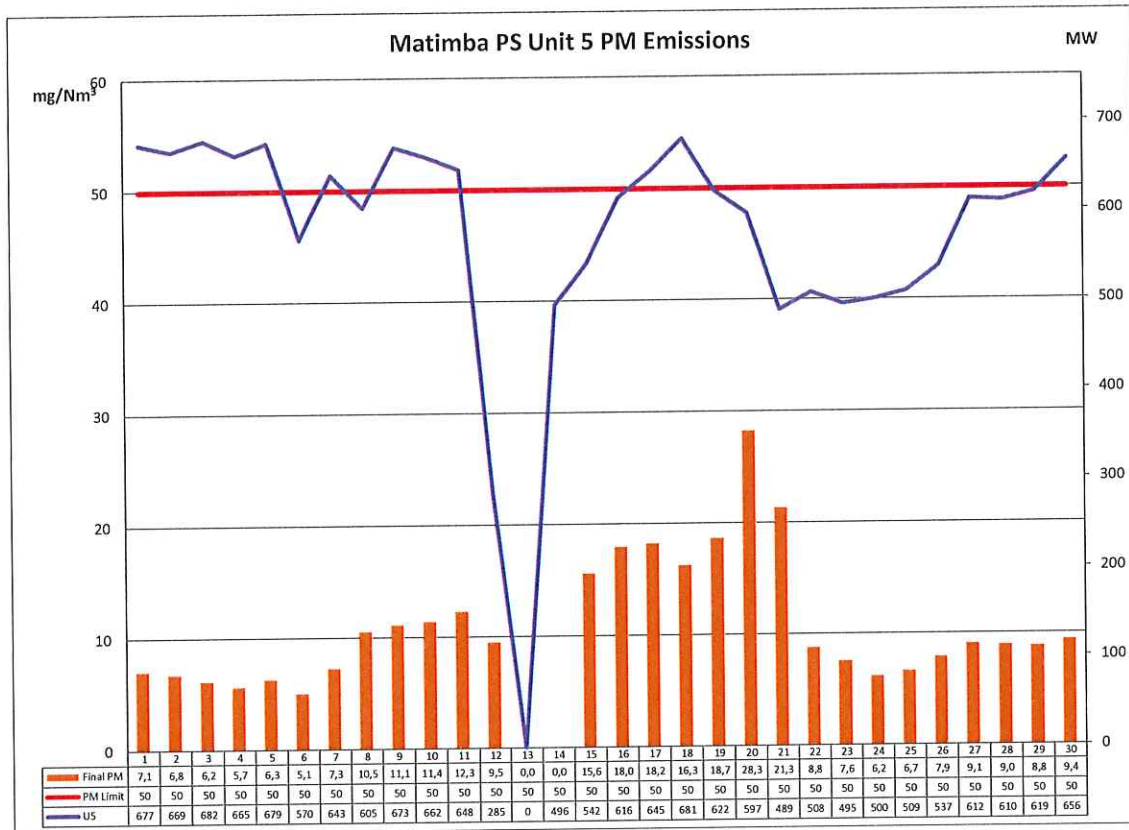


Graph 4: Particulate matter daily average emissions against emission limit for unit 4 for the month of September 2020

Interpretation:

All daily averages below particulate emission limit of 50 mg/Nm³.

Unit 5 particulate emissions

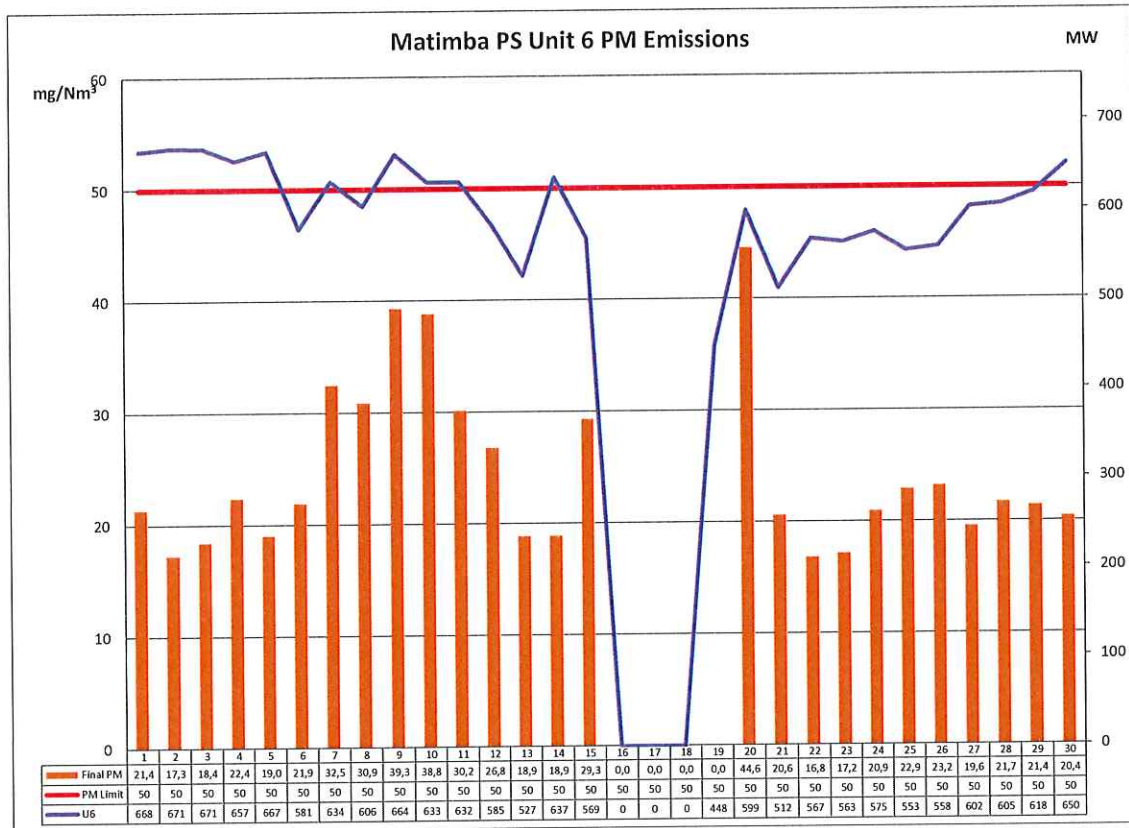


Graph 5: Particulate matter daily average emissions against emission limit for unit 5 for the month of September 2020

Interpretation:

All daily averages below particulate emission limit of 50 mg/Nm³.

Unit 6 particulate emissions

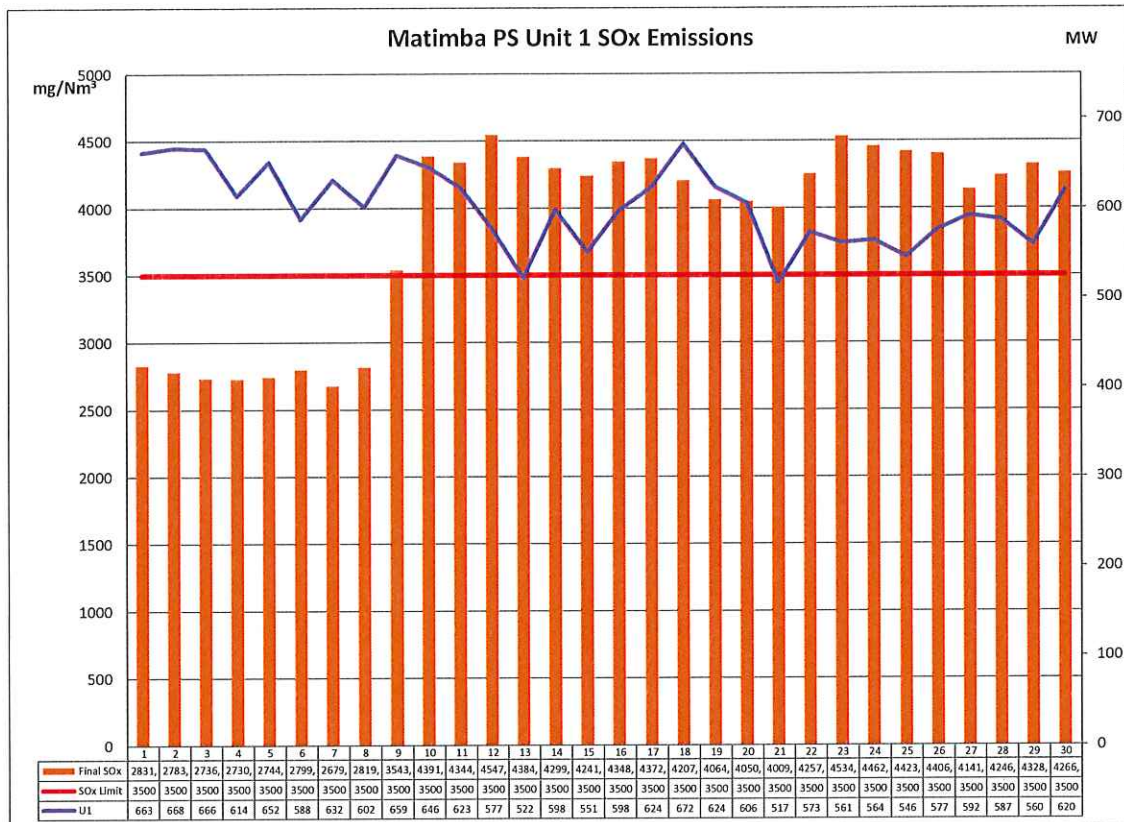


Graph 6: Particulate matter daily average emissions against emission limit for unit 6 for the month of September 2020

Interpretation:

All daily averages below particulate emission limit of 50 mg/Nm³.

Unit 1 SO₂ emissions

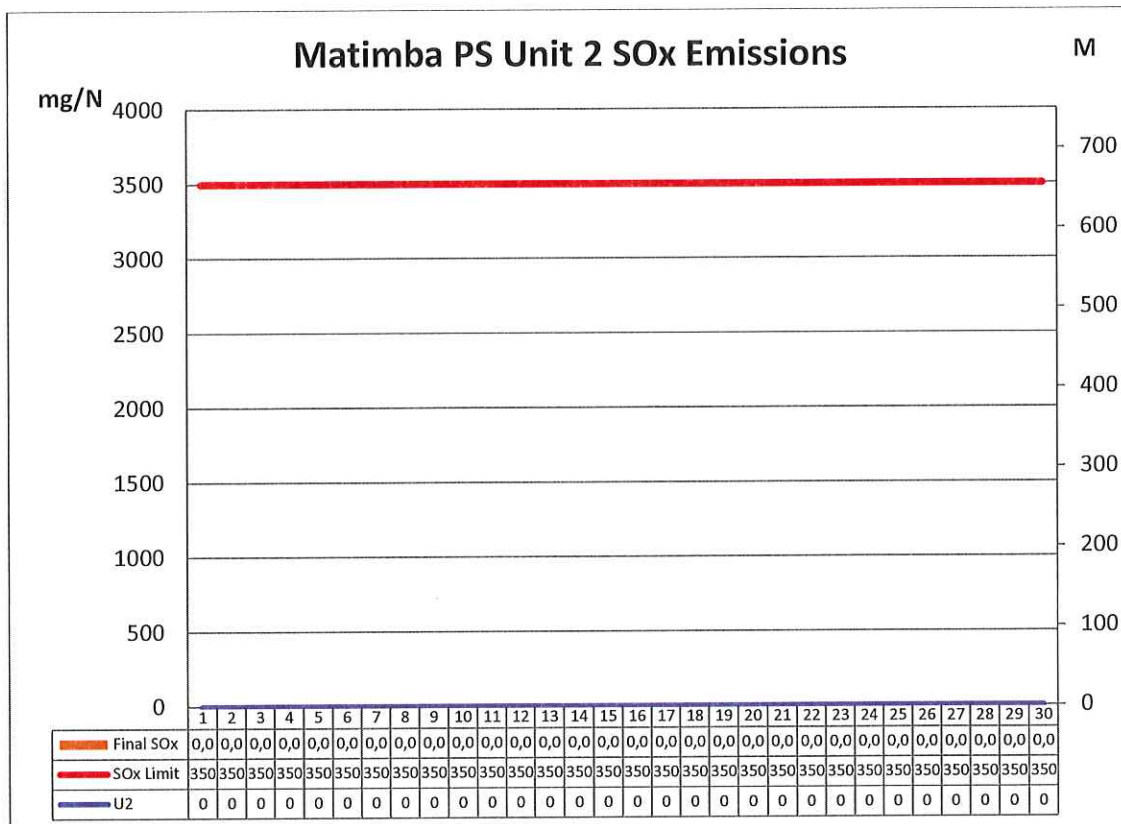


Graph 7: SO₂ daily average emissions against emission limit for unit 1 for the month of September 2020

Interpretation:

An increase in emissions were observed after a calibration performed on the 9th of September 2020 leading to the exceedance of the monthly average SO_x emission limit of 3500 mg/Nm³ with the monthly average SO_x emissions for September being 3867mg/Nm³. The increase is being investigated and corrective actions will be put in place to resolve and prevent re-occurrence.

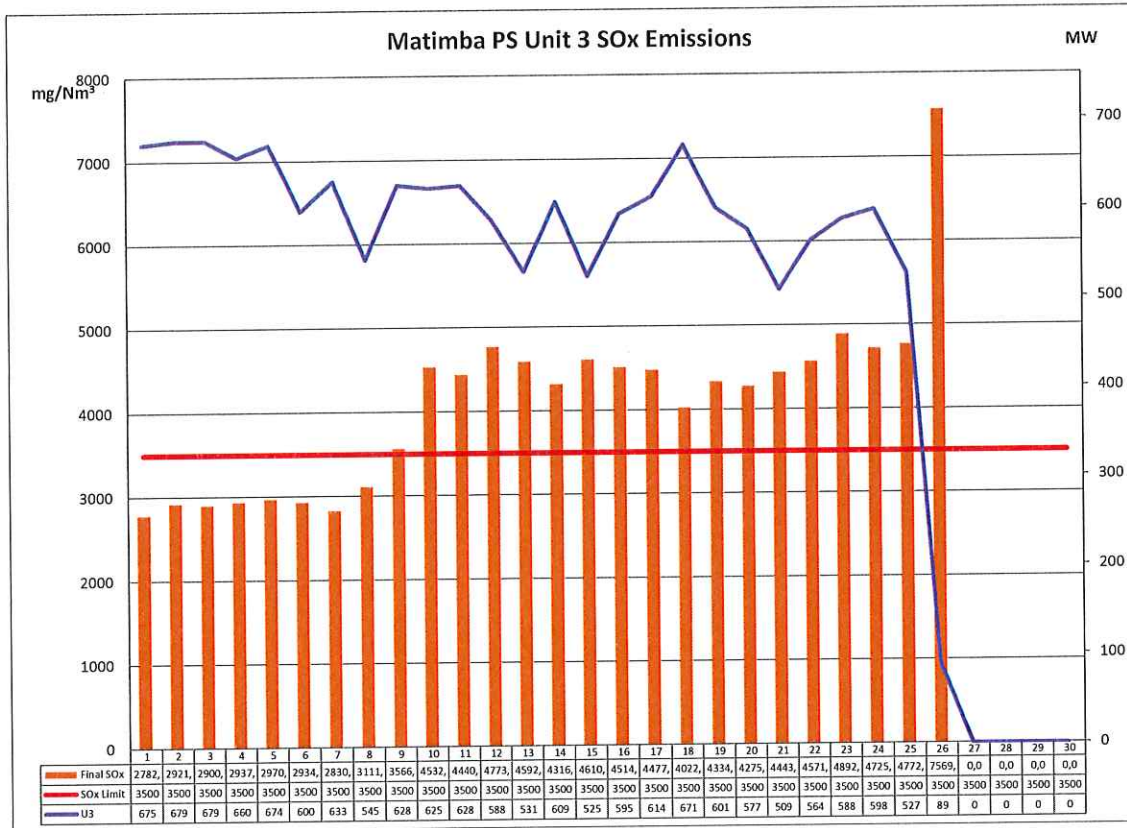
Unit 2 SO₂ emissions



Graph 8: SO₂ daily average emissions against emission limit for unit 2 for the month of September 2020

Interpretation:
Unit 2 is on outage.

Unit 3 SO₂ emissions

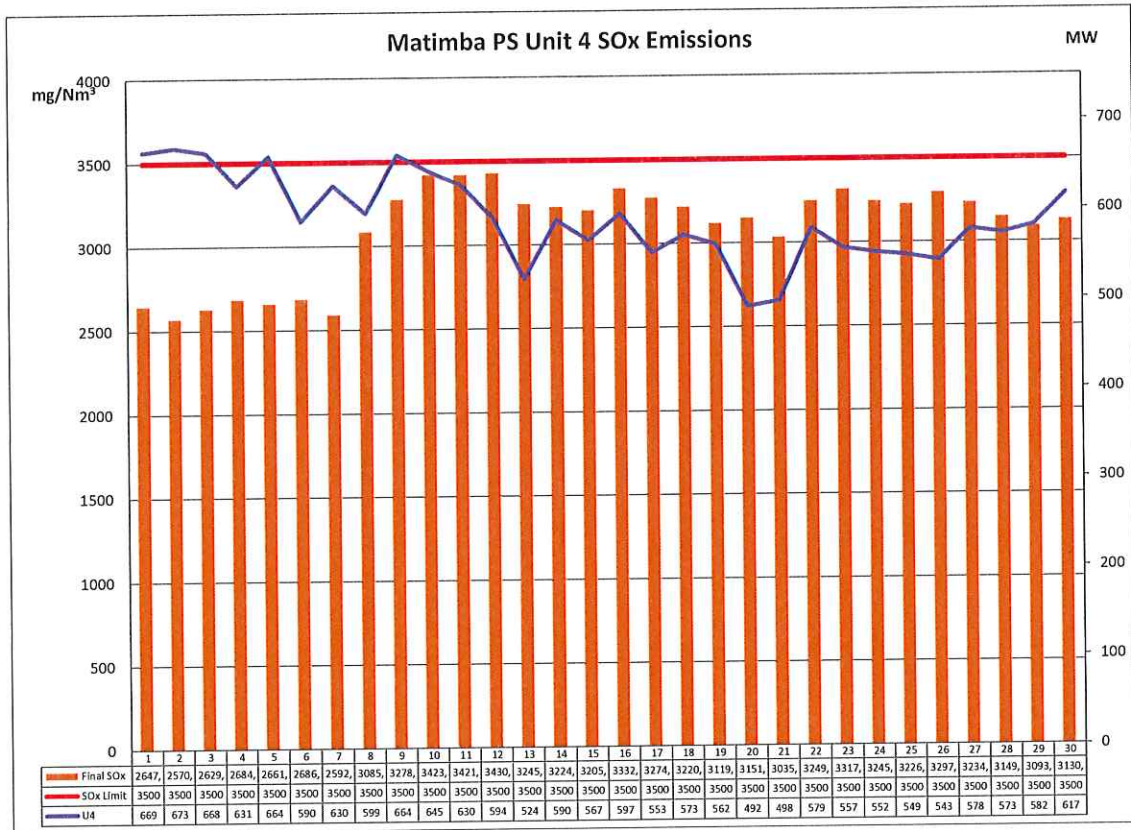


Graph 9: SO₂ daily average emissions against emission limit for unit 3 for the month of September 2020

Interpretation:

An increase in emissions were observed after a calibration performed on the 9th of September 2020 leading to the exceedance of the monthly average SO_x emission limit of 3500 mg/Nm³ with the monthly average SO_x emissions for September being 4109 mg/Nm³. The increase is being investigated and corrective actions will be put in place to resolve and prevent re-occurrence.

Unit 4 SO₂ emissions

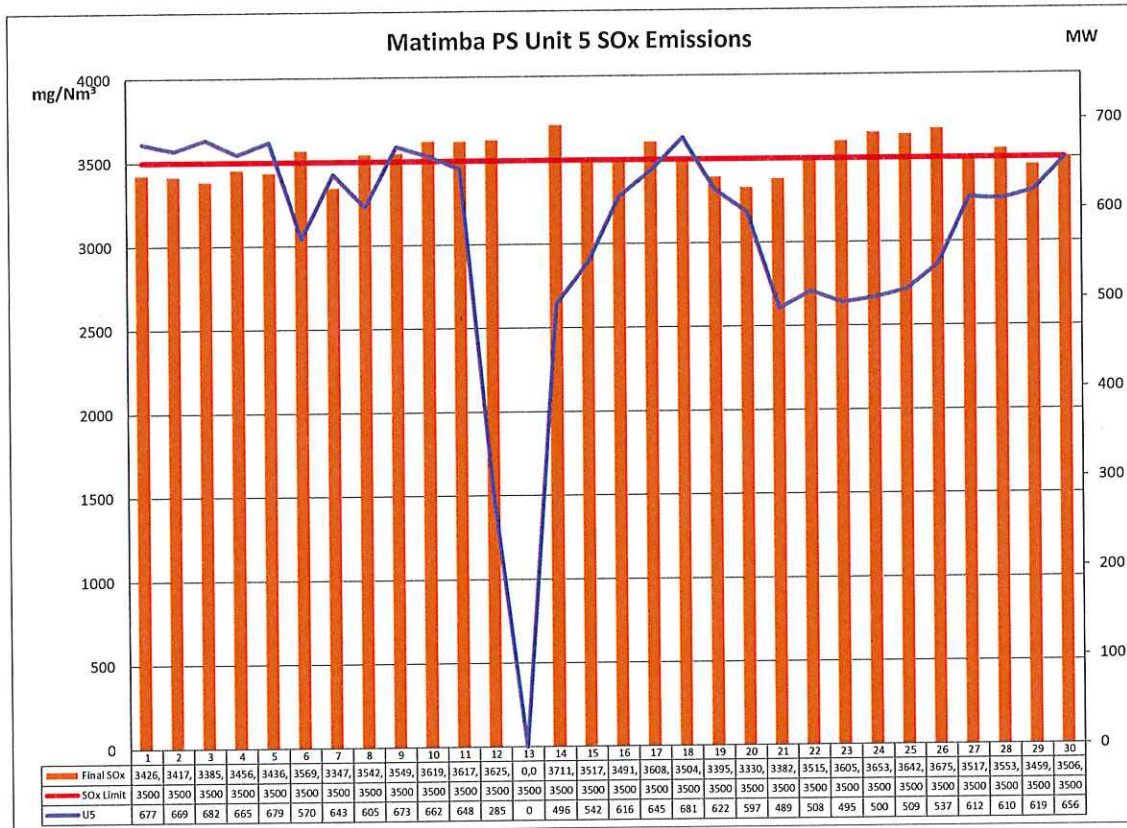


Graph 10: SO₂ daily average emissions against emission limit for unit 4 for the month of September 2020

Interpretation:

All daily averages below SO₂ emission limit of 3500 mg/Nm³.

Unit 5 SO₂ emissions



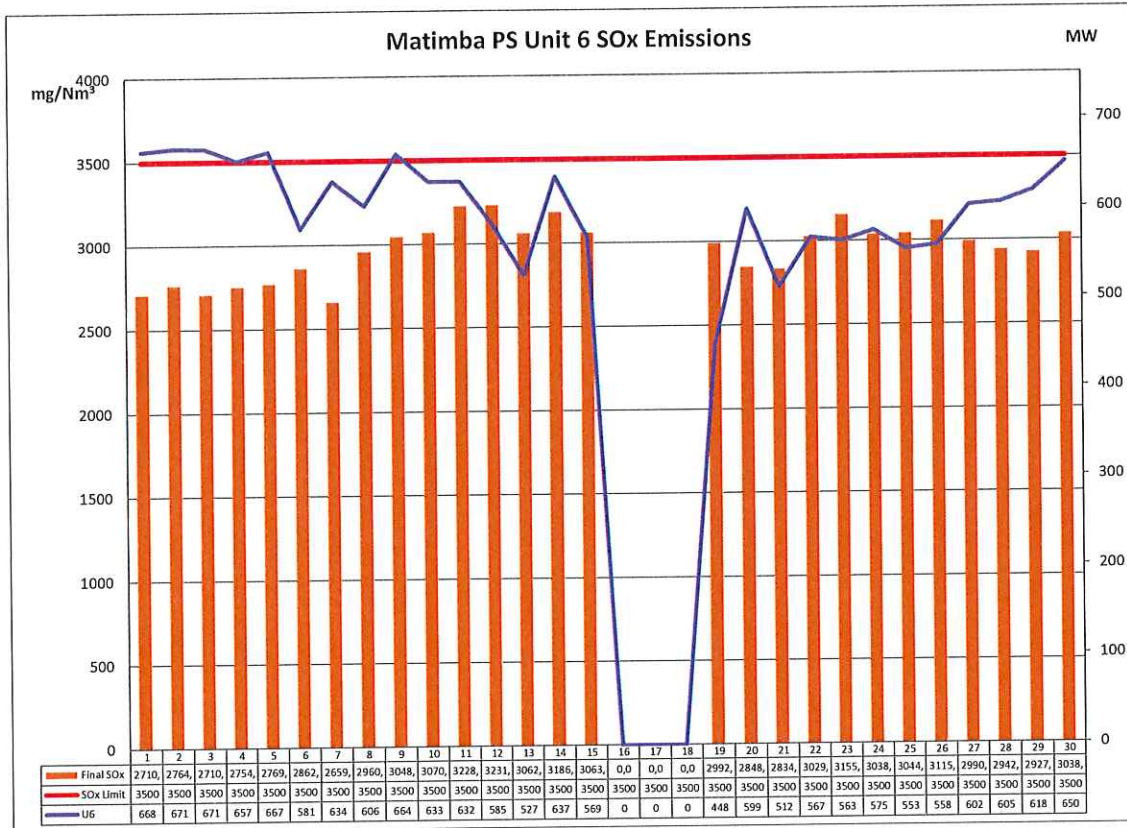
Graph 11: SO₂ daily average emissions against emission limit for unit 5 for the month of September 2020

Interpretation:

Monthly average SO_x emissions were 3519mg/Nm³ which exceeds the monthly average SO_x emission limit of 3500mg/Nm³.

It is suspected that the exceedances are due to an increase in the sulphur content of the coal used in the combustion process. The exceedances will be thoroughly investigated to determine the root cause.

Unit 6 SO₂ emissions

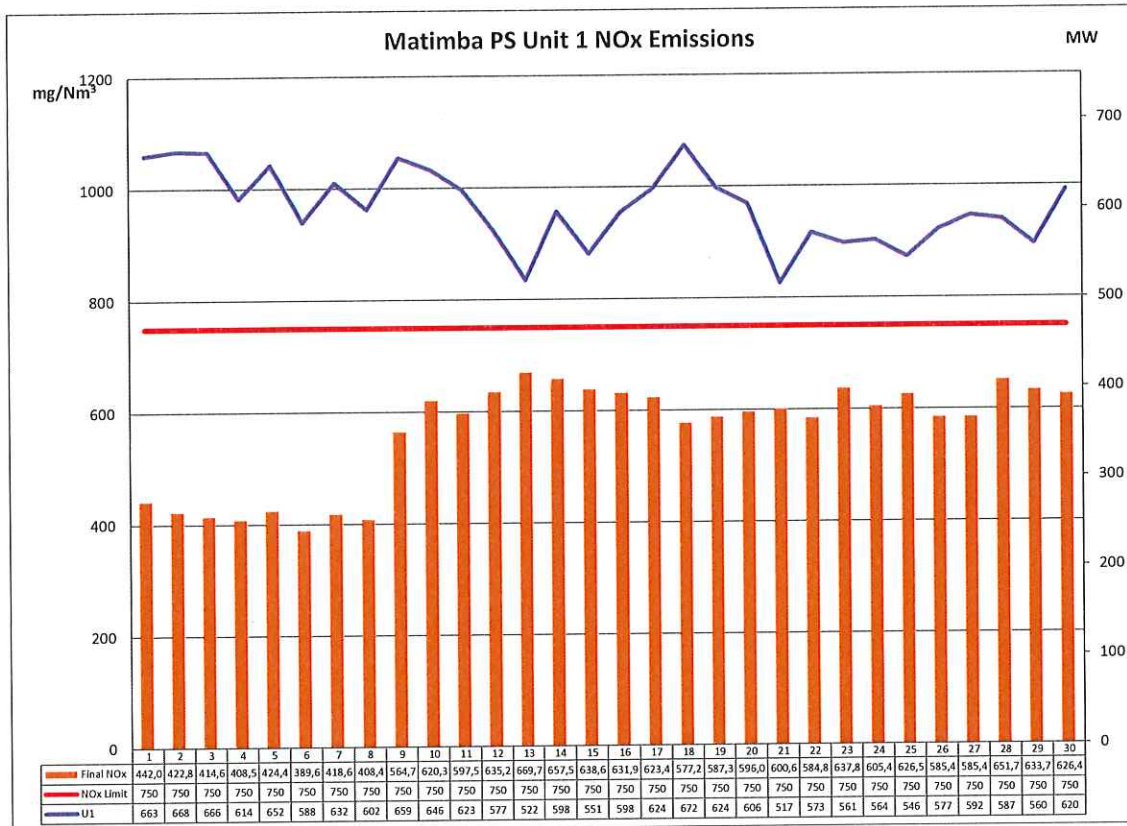


Graph 12: SO₂ daily average emissions against emission limit for unit 6 for the month of September 2020

Interpretation:

All daily averages below SO₂ emission limit of 3500 mg/Nm³.

Unit 1 NO_x emissions

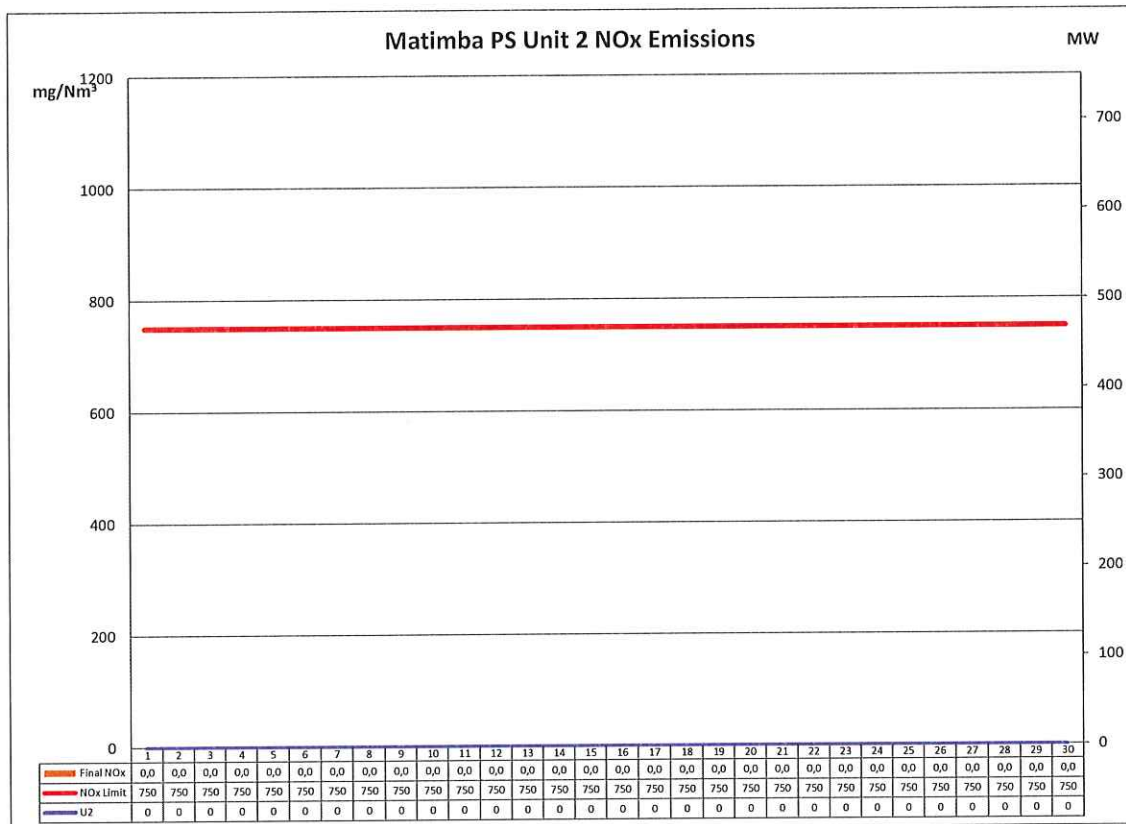


Graph 13: NO_x daily average emissions against emission limit for unit 1 for the month of September 2020

Interpretation:

All daily averages below NO_x emission limit of 750 mg/Nm³.

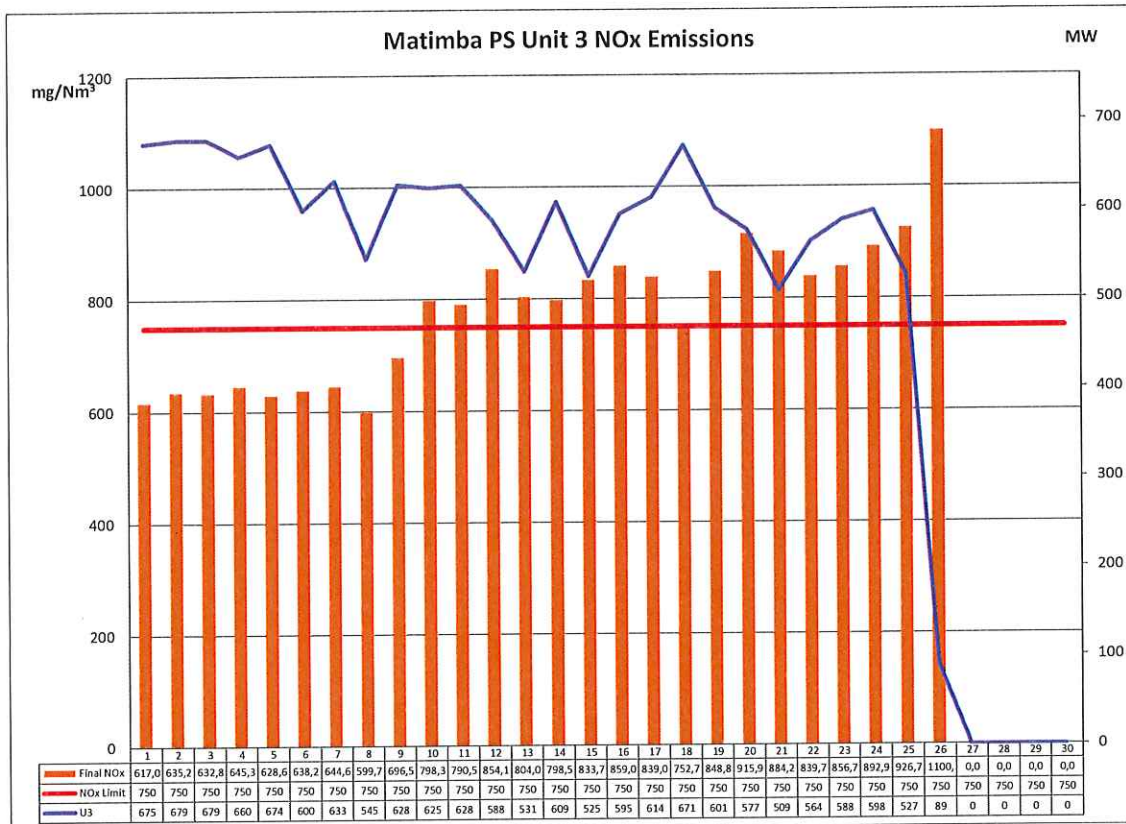
Unit 2 NO_x emissions



Graph 14: NO_x daily average emissions against emission limit for unit 2 for the month of September 2020

Interpretation:
Unit 2 on outage

Unit 3 NO_x emissions

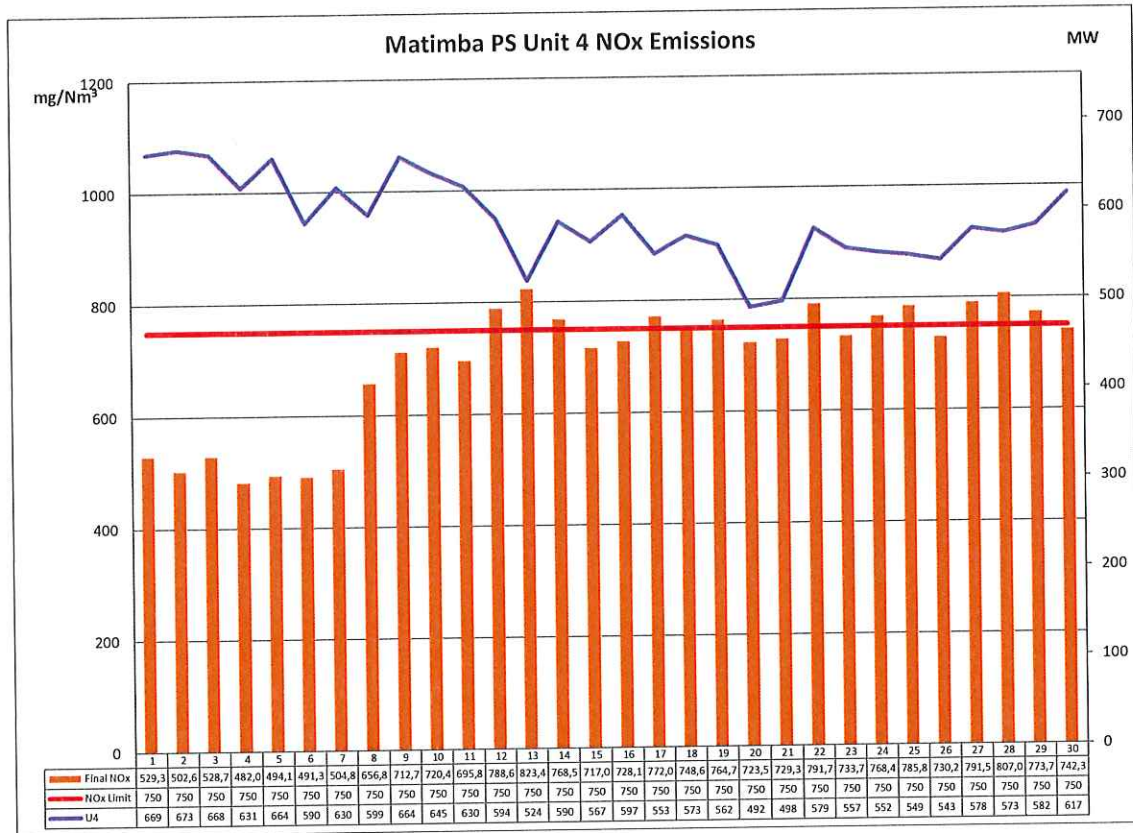


Graph 15: NO_x daily average emissions against emission limit for unit 3 for the month of September 2020

Interpretation:

An increase in emissions were observed after a calibration performed on the 10th of September 2020. The limit of 750mg/Nm³ has been exceeded from the 10th of September 2020. The increase is being investigated and corrective actions will be put in place to resolve and prevent re-occurrence.

Unit 4 NO_x emissions

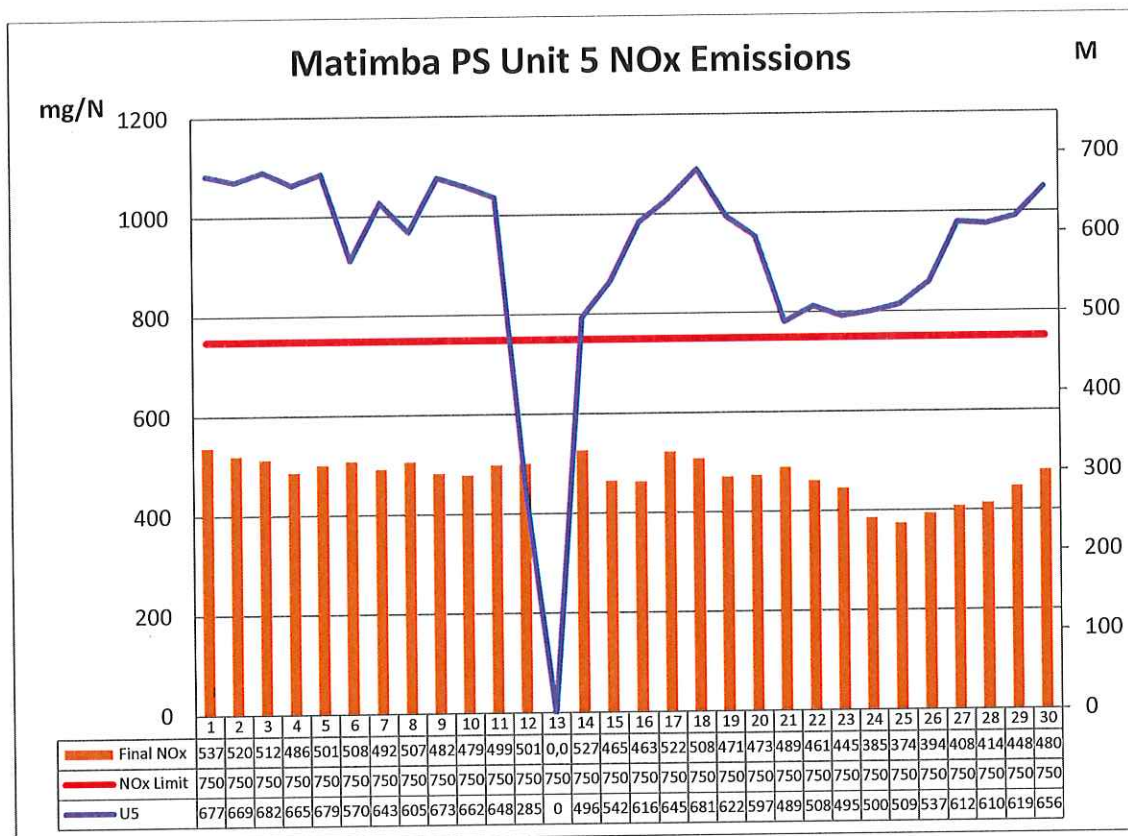


Graph 16: NO_x daily average emissions against emission limit for unit 4 for the month of September 2020

Interpretation:

An increase in emissions were observed after a calibration performed on the 10th of September 2020. The limit of 750mg/Nm³ has been exceeded on the 12th to 14th, 17th, 19th, 22nd, 24th to 25th and the 27th to 29th of September 2020. The increase is being investigated and corrective actions will be put in place to resolve and prevent re-occurrence.

Unit 5 NO_x emissions

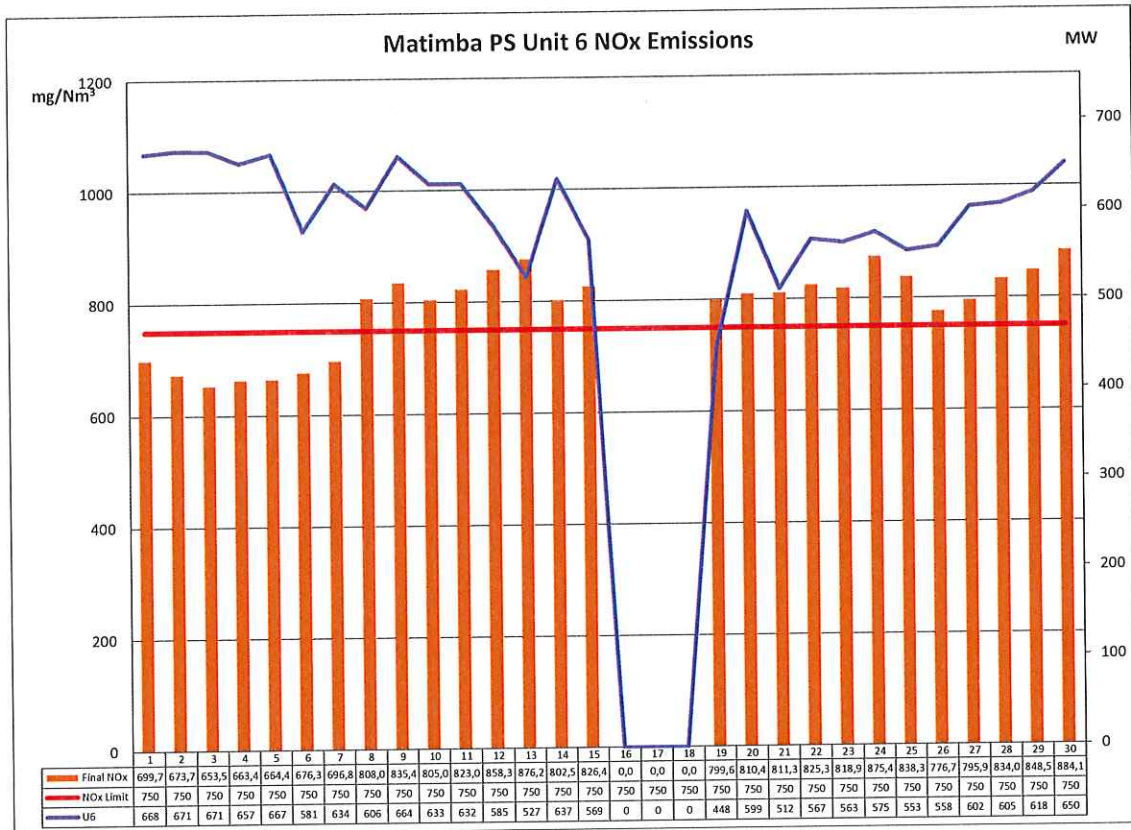


Graph 17: NO_x daily average emissions against emission limit for unit 5 for the month of September 2020

Interpretation:

All daily averages below NO_x emission limit of 750 mg/Nm³.

Unit 6 NO_x emissions



Graph 18: NO_x daily average emissions against emission limit for unit 6 for the month of September 2020

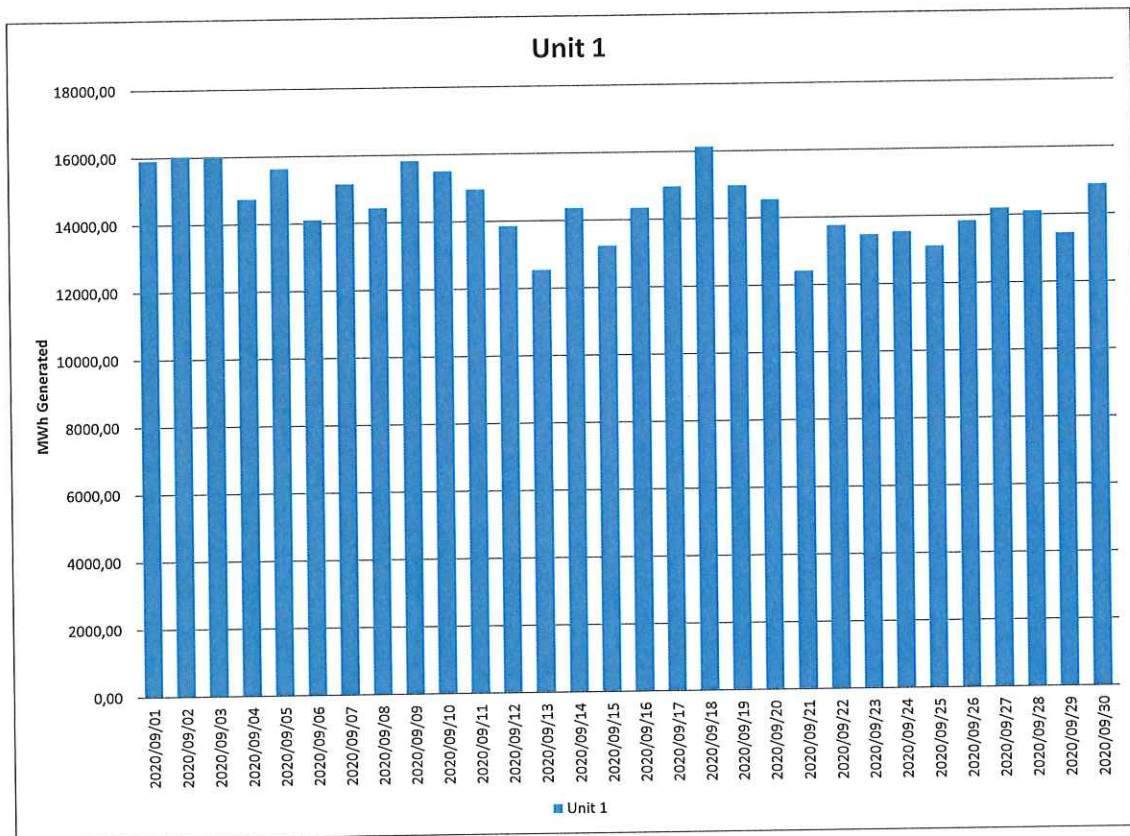
Interpretation:

An increase in emissions were observed after a calibration performed on the 8th of September 2020. The limit of 750mg/Nm³ has been exceeded from the 8th of September 2020. The increase is being investigated and corrective actions will be put in place to resolve and prevent re-occurrence.

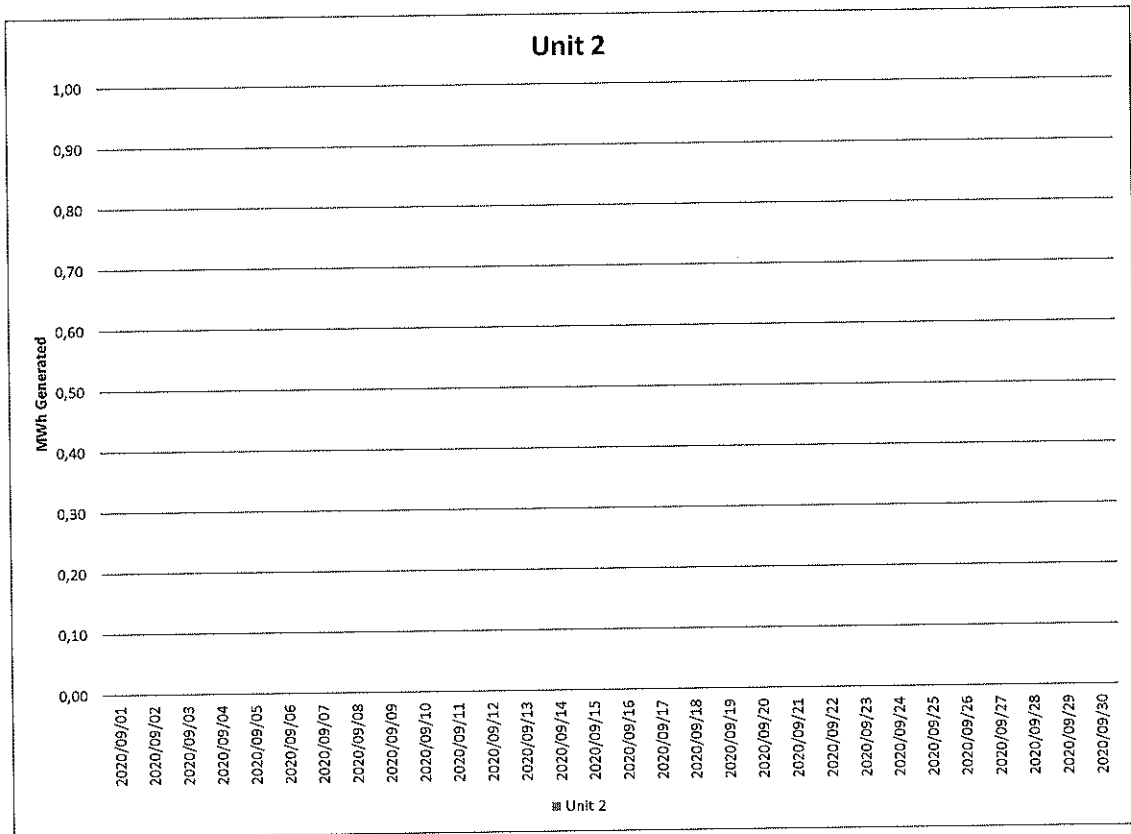
Table 4: Daily power generated per unit in MWh for the month of September 2020

Date	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
2020/09/01	15914,67	0,00	16115,93	15982,33	16119,70	15916,07
2020/09/02	16035,27	0,00	16211,93	16086,27	15931,40	16032,20
2020/09/03	16004,20	0,00	16214,13	15964,27	16223,50	16000,40
2020/09/04	14751,07	0,00	15763,07	15069,73	15829,00	15669,27
2020/09/05	15654,73	0,00	16090,20	15860,13	16151,20	15922,93
2020/09/06	14113,07	0,00	14320,20	14110,87	13572,40	13847,07
2020/09/07	15169,47	0,00	15114,47	15056,20	15293,60	15112,73
2020/09/08	14451,13	0,00	13025,07	14310,87	14405,80	14436,80
2020/09/09	15833,80	0,00	15002,40	15863,40	16008,40	15815,13
2020/09/10	15518,67	0,00	14920,47	15422,40	15747,10	15067,87
2020/09/11	14971,07	0,00	14985,00	15053,87	15413,80	15067,00
2020/09/12	13864,33	0,00	14042,00	14190,00	212,40	13925,60
2020/09/13	12545,87	0,00	12668,87	12524,73	0,00	12557,07
2020/09/14	14372,33	0,00	14530,27	14096,07	4876,90	15091,33
2020/09/15	13239,07	0,00	12539,60	13552,53	12895,30	12970,00
2020/09/16	14355,93	0,00	14200,07	14255,80	14647,20	0,00
2020/09/17	14977,93	0,00	14654,33	13212,80	15336,00	0,00
2020/09/18	16140,00	0,00	16028,40	13683,87	16204,80	0,00
2020/09/19	14989,93	0,00	14335,60	13420,07	14796,30	3453,13
2020/09/20	14558,13	0,00	13771,07	11755,73	14198,30	14249,87
2020/09/21	12421,47	0,00	12148,93	11908,40	11637,10	12205,87
2020/09/22	13767,40	0,00	13457,67	13840,67	12086,40	13482,27
2020/09/23	13483,73	0,00	14024,33	13306,40	11781,50	13398,00
2020/09/24	13559,93	0,00	14280,33	13187,20	11912,20	13667,07
2020/09/25	13113,53	0,00	12584,87	13108,80	12122,80	13160,93
2020/09/26	13850,67	0,00	14,87	12972,13	12777,80	13279,87
2020/09/27	14215,60	0,00	0,00	13803,27	14563,00	14332,13
2020/09/28	14116,60	0,00	0,00	13692,40	14516,30	14409,87
2020/09/29	13453,47	0,00	0,00	13898,27	14739,10	14738,67
2020/09/30	14898,87	0,00	0,00	14743,87	15615,20	15575,40

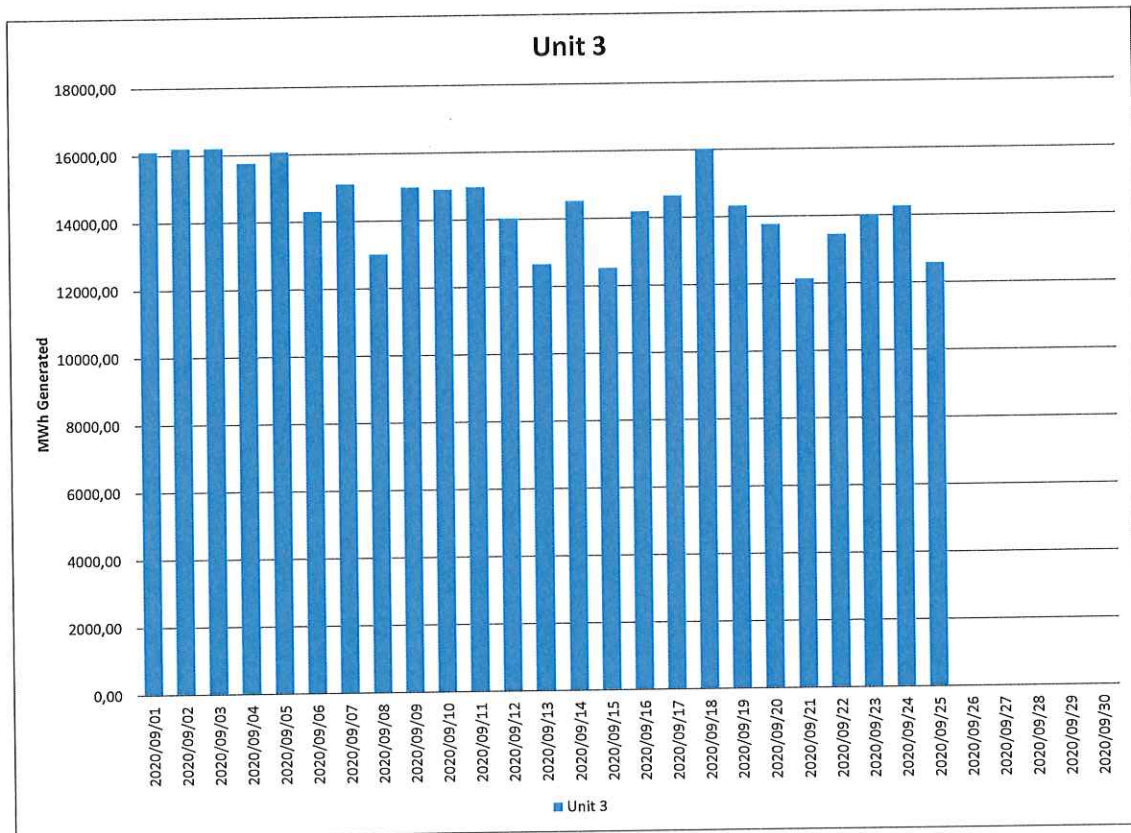
Graph 19: Unit 1 daily generated power in MWh for the month of September 2020



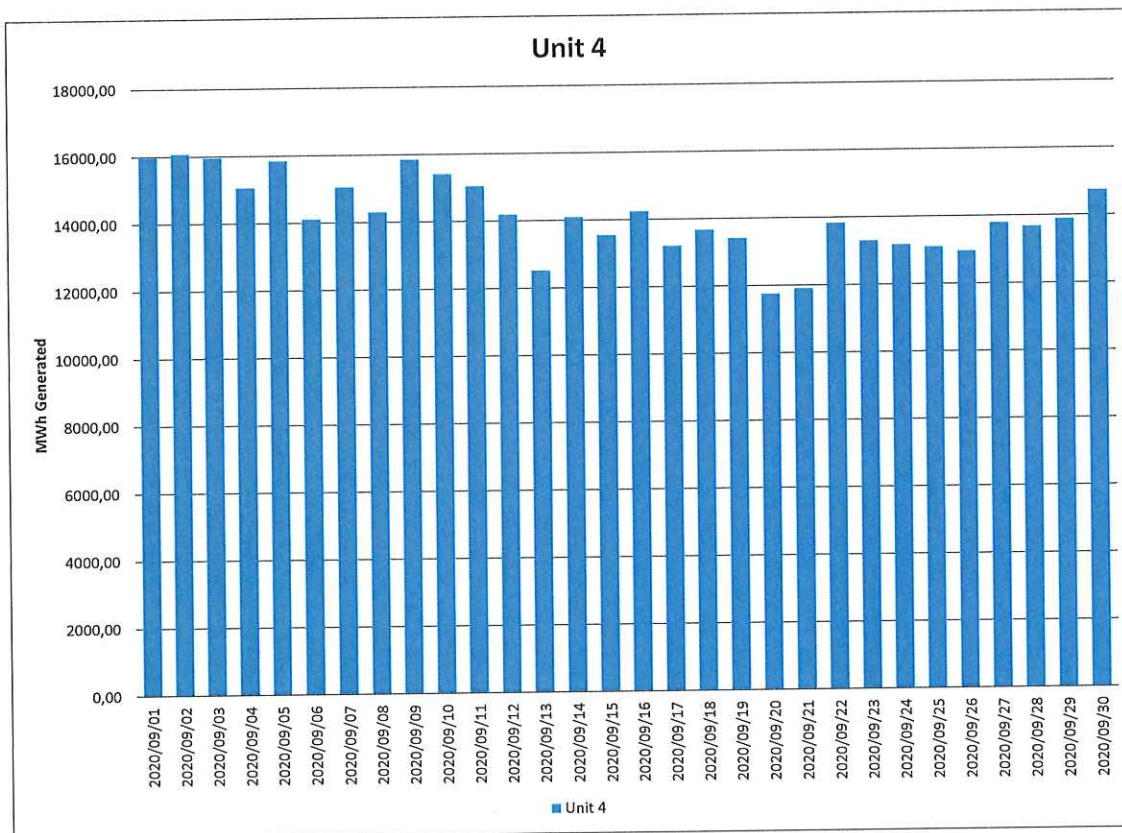
Graph 20: Unit 2 daily generated power in MWh for the month of September 2020



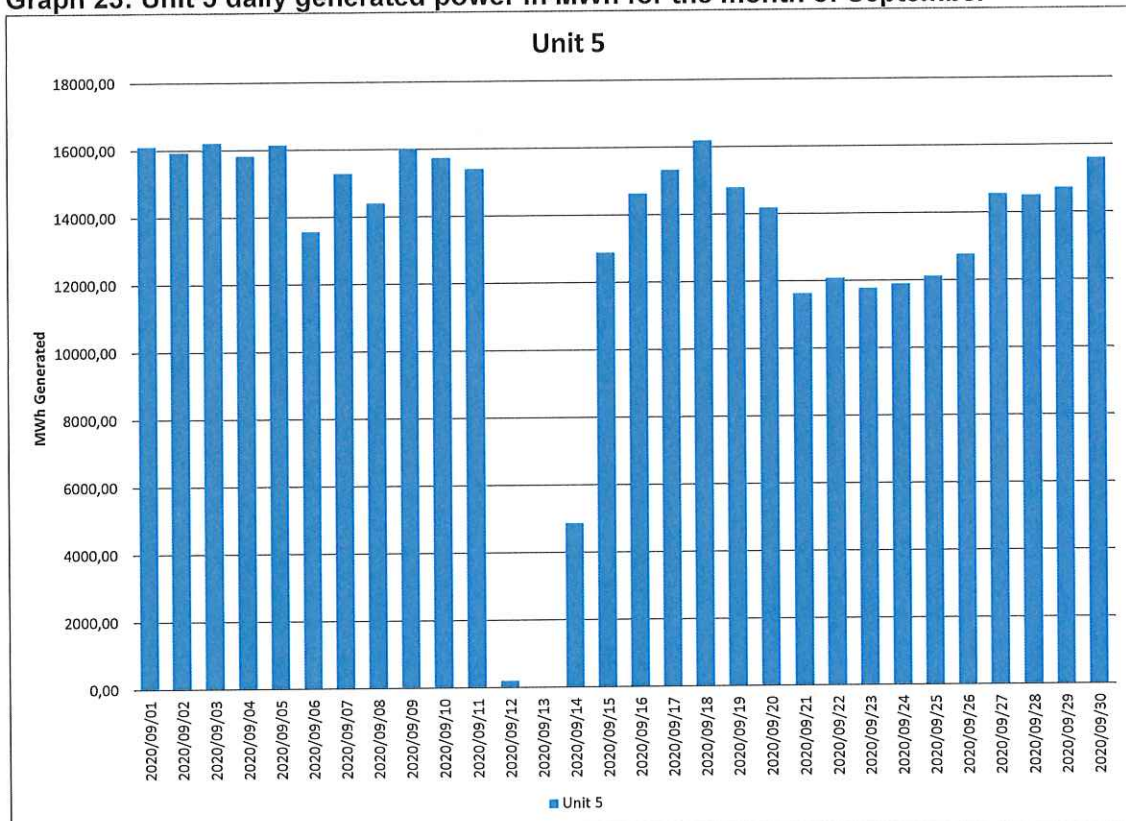
Graph 21: Unit 3 daily generated power in MWh for the month of September 2020



Graph 22: Unit 4 daily generated power in MWh for the month of September 2020



Graph 23: Unit 5 daily generated power in MWh for the month of September



2020

Graph 24: Unit 6 daily generated power in MWh for the month of September 2020

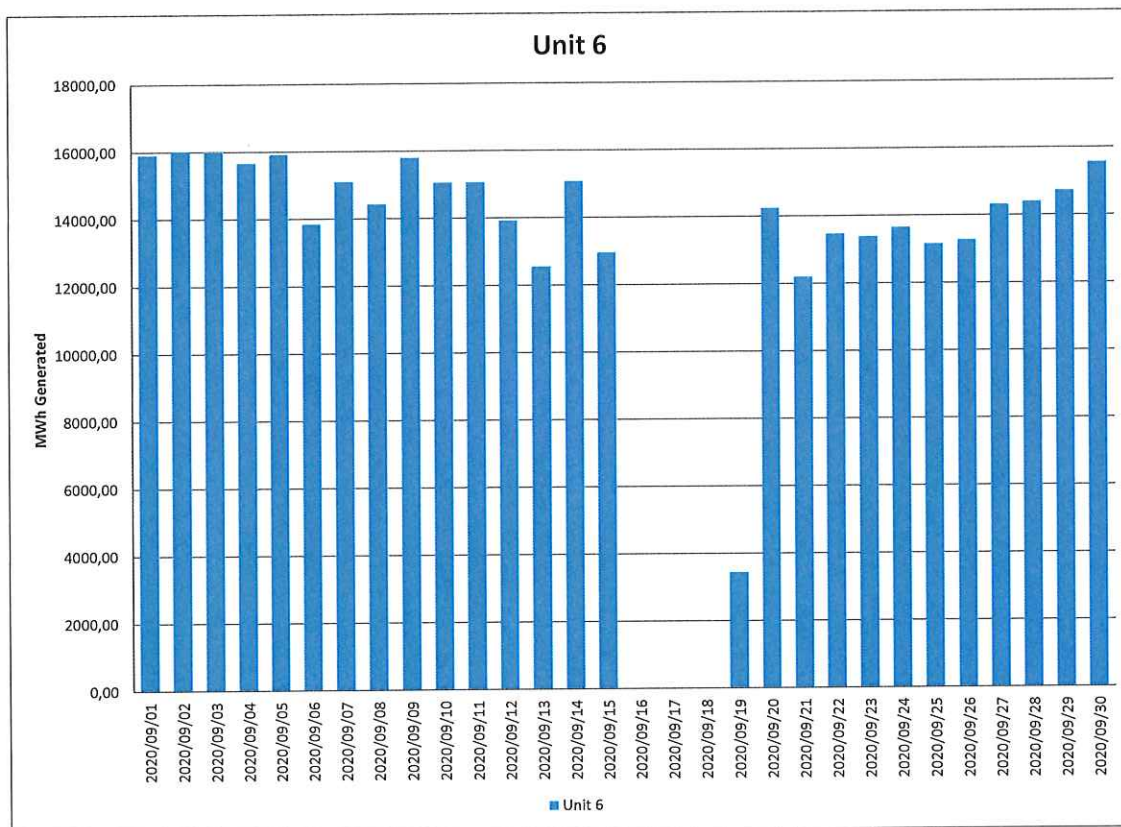


Table 5: Pollutant tonnages for the month of September 2020

Unit	PM (tons)	SO ₂ (tons)	NO ₂ (tons)	CO (tons)	CO ₂ (tons)
1	27,310	6 811,333	993,751	11,386	348 585,015
2	0,000	0,000	0,000	0,000	0,000
3	41,003	4 651,582	906,384	0,118	301 932,169
4	37,651	6 358,469	1 415,124	11,765	389 238,183
5	20,181	6 747,729	912,394	17,305	375 872,567
6	41,123	5 182,506	1 375,072	18,281	340 922,139
SUM	167,267	29 751,619	5 602,725	58,856	1 756 550,072

Table 6: Reference values for data provided.

Compound / Parameter	Units of Measure	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Oxygen	%	9,64		11,11	8,61	7,78	9,01
Moisture	%	4,51		3,77	5,14	4,10	4,08
Velocity	m/s	26,9		24,5	28,5	26,3	28,4
Temperature	°C	140,9		138,3	130,3	128,7	121,7
Pressure	mBar	935,7		930,0	922,8	930,0	889,9

Start-up information.

Table 7: Start-up information

Unit	5	
Fires in	08H40	2020-09-14
Synchronization with Grid	14H02	2020-09-14
Emissions below limit	15H01	2020-09-14
Fires in to synchronization	5.367	Hours
Synchronization to < Emission limit	0.983	Hours

Unit	6	
Fires in	11H07	2020-09-19
Synchronization with Grid	16H15	2020-09-19
Emissions below limit	18H10	2020-09-19
Fires in to synchronization	5.133	Hours
Synchronization to < Emission limit	1.917	Hours

Emergency Generation

Table 8: Emergency Generation.

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Emergency Generation hours declared by national Control	230	0	209	230	222	188
Emergency Hours declared including hours after stand down	256	0	231	256	246	209
Days over the Limit during Emergency Generation	0	0	0	0	0	0

Complaints Register

Table 9: Complaints.

Source Code/ Name	Root Cause Analysis	Calculation of Impacts/ emissions associated with the incident	Dispersion modeling of pollutants where applicable	Measures implemented to prevent reoccurrence	Date by which measure will be implemented
None					

Table 10: Total volatile compound estimates.

		
CALCULATION OF EMISSIONS OF TOTAL VOLATILE COMPOUNDS FROM FUEL OIL STORAGE TANK		
Date:	Monday, 19 October 2020	
Station:	Matimba Power Station	
Province:	Limpopo Province	
Tank no.	1-4	
Description:	Outdoor fuel oil storage tank	
Tank Type:	Vertical fixed roof (vented to atmosphere)	
Material stored:	Fuel Oil 150	
MONTHLY INPUT DATA FOR THE STATION Please only insert relevant monthly data inputs into the <u>blue cells</u> below Choose from a dropdown menu in the <u>green cells</u> The total VOC emissions for the month are in the <u>red cells</u> IMPORTANT: Do not change <u>any</u> other cells without consulting the AQ CoE		
MONTH:	September	
GENERAL INFORMATION:	Data	Unit
Total number of fuel oil tanks:	4	NA
Height of tank:	13,34	m
Diameter of tank:	9,53	m
Net fuel oil throughput for the month:	373.713	tons/month
Molecular weight of the fuel oil:	166,00	Lb/lb-mole
METEROLOGICAL DATA FOR THE MONTH	Data	Unit
Daily average ambient temperature	23,43	°C
Daily maximum ambient temperature	31,06	°C
Daily minimum ambient temperature	16,52	°C
Daily ambient temperature range	14,54	°C
Daily total insolation factor	4,41	kWh/m²/day
Tank paint colour	Grey/medium	NA
Tank paint solar absorbance	0,68	NA
FINAL OUTPUT:	Result	Unit
Breathing losses:	0,54	kg/month
Working losses:	0,01	kg/month
TOTAL LOSSES (Total TVOC Emissions for the month):	0,55	kg/month
*Calculations performed on this spreadsheet are taken from the USEPA AP-42- Section 7.1 Organic Liquid Storage Tanks - January 1996. This spreadsheet is derived from materials provided by Jimmy Peress, PE, Trittech Consulting Engineers, 85-93 Chevy Chase Street, Jamaica, NY 11432 USA, Tel - 718-454-3920, Fax - 718-454-6330, e-mail - PeressJ@nyc.rr.com.		

Table 11: Average % availability of monitors for the month of September 2020.

Associated Unit/Stack	PM	SO ₂	NO	CO ₂
Unit 1	100,0	99,9	100,0	99,9
Unit 2				
Unit 3	96,2	95,8	95,8	95,5
Unit 4	100,0	99,7	99,7	99,7
Unit 5	100,0	99,7	99,9	99,7
Unit 6	100,0	99,5	99,5	99,5

Ambient Air quality Monitoring

Three (3) exceedance of the PM₁₀ national daily limit were recorded in September 2020. No other parameters exceeded the set limits during the monitoring period.

Ambient PM_{2.5}, PM₁₀ and NO₂ concentrations at Marapong monitoring site show influence of emissions from low level sources in the area while SO₂ concentrations show influence of emissions from both tall stack emitters and low level sources.

The average data recovery for the period was 85.7% and the station availability was 97.6%.

Detailed results can be found in Attachment 1, "Marapong air quality monthly report for September 2020".

General

Name and reference number of the monitoring method used:

1. Particulate and gas monitoring according to standards
 - a. BS EN 14181:2004 - Quality Assurance of Automated Measuring Systems
 - b. ESKOM internal standard 240-56242363 Emissions Monitoring and Reporting Standard

Sampling locations:

1. Stack one
 - a. Particulates:
 - i. S23° 40' 2.8" E027° 36' 34.8" 175m from ground level and 75m from the top.
 - b. Gas:
 - i. S23° 40' 2.8" E027° 36' 34.8" 100m from ground level and 150m from the top.
 - c. Stack height
 - i. 250 meter consist of 3 flues
2. Stack two
 - a. Particulates:
 - i. S23° 40' 14.8" E027° 36' 47.5" 175m from ground level and 75m from the top.
 - b. Gas:
 - i. S23° 40' 14.8" E027° 36' 47.5" 100m from ground level and 150m from the top.
 - c. Stack height
 - i. 250 meter consist of 3 flues

Unit 1

1. 0 out of 32 precipitator fields is out of service.
2. No abnormalities on the SO₃ plant. Preventative maintenance done during the month.

Unit 2

1. Unit off load.

Unit 3

1. 2 out of 32 precipitator fields is out of service. Repairs will be done during the next opportunity outage.
2. No abnormalities on the SO₃ plant. Preventative maintenance done during the month.

Unit 4

1. All precipitator fields in service.
2. No abnormalities on the SO₃ plant. Preventative maintenance done during the month.

Unit 5

1. All precipitator fields in service.
2. No abnormalities on the SO₃ plant. Preventative maintenance done during the month.

Unit 6

1. 3 out of 32 precipitator fields is out of service. Repairs will be done during the next opportunity outage.
2. No abnormalities on the SO₃ plant. Preventative maintenance done during the month.

SO₃ common plant

1. No abnormalities on the sulphur storage plant.

CEMs

1. No adjustments done on the CEMs. Calibration is done every second week.

Particulate monitors

2. No downtime or repairs done on the particulate monitors.

Air quality improvements

1. None

Social responsibility conducted

No campaigns conducted in September 2020

Sampling dates and times

1. Continuous

Attachments

Monthly ambient air quality report

The rest of the information demonstrating compliance with the emission license conditions is supplied in the annual emission report sent to your office.

Hoping the above will meet your satisfaction.

I hereby declare that the information in this report is correct.

Yours sincerely

Handwritten signature and date: 2020/11/05

GENERAL MANAGER: MATIMBA POWER STATION